SAINT JOHN AIR QUALITY DATA

ANNUAL REPORT - 1981

D - 8304

AIR QUALITY SECTION

POLLUTION CONTROL BRANCH

ENVIRONMENT NEW BRUNSWICK

ENVIRONNEMENT NOUVEAU-BRUNSWICK

CASIER POSTAL / P.O. BOX 6000, FREDERICTON, N.B., CANADA E3B 5H1

ISSN 0382-120X

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POLLUTION CONTROL BRANCH

MARCH 1983

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ANNUAL REPORT

SAINT JOHN AIR QUALITY

1. INTRODUCTION

The following tables and graphs provide information on the quality of the ambient air of the Saint John, New Brunswick region for 1981.

The data in this report consists of monthly averages of various pollutant concentrations and annual averages calculated from the monthly averages. The annual averages for total suspended particulates and sulphates are calculated as geometric means. Exceedances of provincial standards are also indicated.

A monthly average was not included in the calculation of the annual average if less than fifty percent of the hourly values were available and validated. An annual average for a pollutant was calculated if seven or more monthly values for that pollutant were available.

The parameters presented in this annual report are sulphur dioxide, carbon monoxide, nitrogen dioxide, ozone, total suspended particulates, dustfall, sulphation rate and total suspended sulphates.

2. METHODS OF MEASUREMENT

Carbon Monoxide: Carbon monoxide (CO) is measured continuously by non-dispersive infrared spectrometry (NDIR). Air is pumped at a controlled rate through a filter media to remove moisture and particulates and into the analyzer. A comparison is made of the infrared energy absorbed by the air sample and that absorbed by a reference cell. The difference is proportional to the carbon monoxide reading.

Dustfall: Dustfall is a measurement of the larger size particulates which settle out under the influence of gravity. It is measured by exposing open top vessels of specified dimensions for a period of 30 days. The total dustfall is weighed and the results are expressed in units of grams per square meter.

Hydrogen Sulphide: Hydrogen sulphide (H_2S) concentrations are measured by passing a continuous sample through a scrubber to remove other sulphur compounds. The H_2S reacts with free bromine producing a change in potential. This potential regenerates the free bromine with the current produced being a measure of the H_2S in the sample.

Lead: Lead is determined by chemically analyzing the filters used for measuring total suspended particulate.

Nitrogen Dioxide: Nitrogen dioxide (NO_2) concentrations are monitored by the principle of photometric detection of the chemiluminescense resulting from the flameless-gas-phase reaction of nitrogen-oxide (NO) and Ozone (O_3). Light emission results when electronically excited NO_2 molecule revert to their ground state. The light waves are converted to electrical energy by a photomultiplier tube. This electrical energy produced is proportional to the nitrogen dioxide in the sample.

Ozone: Ozone concentrations are monitored by the principle of photometric detection of the chemiluminescense (CHE) resulting from the flameless-gas-phase reaction of ethylene with O_3. This reaction produces light waves which are converted to electrical energy by a photomultiplier tube. The resultant electrical energy is proportional to the concentration of O_3 in the sample.

Sulphation Rate: The sulphation rate is measured by exposing lead peroxide candles or plates of specified surface area to the ambient air for a 30 day period. The lead peroxide reacts with sulphur compounds in the atmosphere producing lead sulphate. The results are expressed as milligrams of sulphur trioxide (SO_3) per 100 square centimetres per day.

Sulphur Dioxide: Sulphur Dioxide (SO_2) concentrations are measured by passing a continuous sample through a scrubber to remove other sulphur compounds. The sulphur dioxide gas reacts with free bromine producing a change in potential. This potential regenerates the free bromine and the current produced is a measure of the SO_2 in the sample.

Suspended Sulphates: Suspended Sulphate is determined by chemically analyzing the filters used for measuring total suspended particulate.

Total Suspended Particulate Matter: Total suspended particulate matter (T.S.P.) in the atmosphere is determined by collecting 24 hour samples on preweighed 8 x 10 inch filter sheets. The filter is re-weighed to determine the mass of the particles collected. Results are reported as micrograms of particulate matter per cubic metre of air drawn through the filter.

3. REGULATIONS AND GUIDELINES

GROUND LEVEL AIR QUALITY

NEW BRUNSWICK REGULATION

Contaminant	1 HR	8 HR	24 HR	Annual
Carbon Monoxide	35,000	15,000	-	-
Hydrogen Sulphide	15	-	5	-
Nitrogen Dioxide	400	-	200	100
Sulphur Dioxide	900	-	300	60
Total Suspended Particulate	-	-	120	70

FEDERAL ACCEPTABLE GUIDELINE

Contaminant	1 HR.	24 HR.	Annual
Ozone	160	50	30

REGULATIONS/GUIDELINES FROM OTHER PROVINCES

Contaminant	24 HR.	Monthly	Annual
Dustfall		7 gm/m^2	4.6 gm/m^2
Lead	5	2	

All values in Micrograms per Cubic Meter unless otherwise noted.

4. MONITORING LOCATIONS

The following is a list of monitoring stations and the pollutants measured at each station.

The parameters measured in the Saint JOhn area are:

Sulphur Dioxide = SO_2

Carbon Monoxide = CO

Ozone = O_3

Nitrogen Dioxide = NO_2

Total Suspended Particulates = T.S.P.

Suspended Sulphates = SO_4

Sulphation Rate = S.R.

Dustfall = Dust

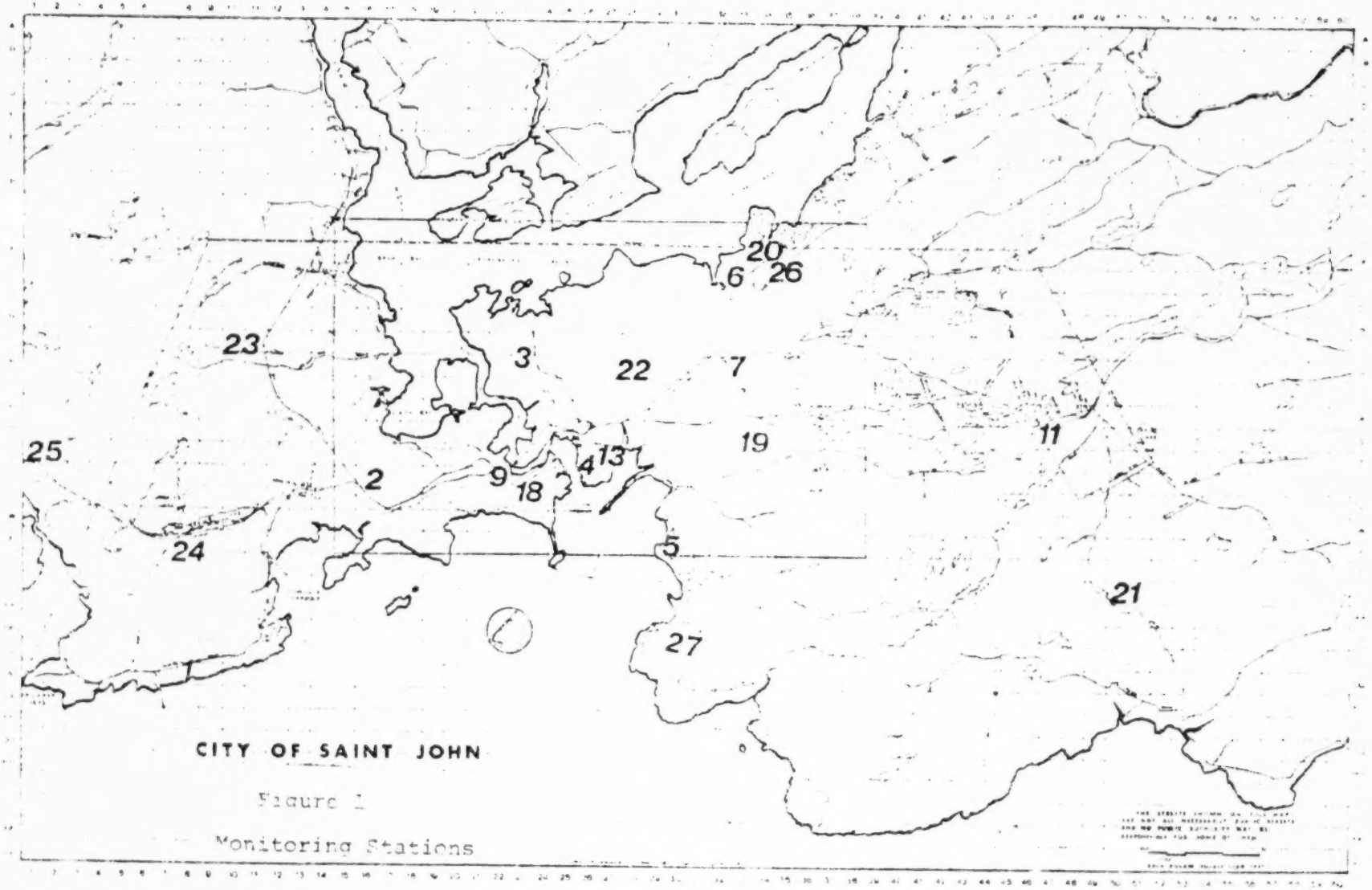
The monitoring stations and the parameters measured at each location are:

CODE		STATION AND PARAMETERS
01	(1)	Lorneville-McCavour - T.S.P., S.R.
02	(2)	Western District Police Station - SO_2, T.S.P., S.R., SO_4
03	(3)	Millidgeville - SO_2, T.S.P., S.R.
04	(4)	Post Office - SO_2
05	(5)	Red Head - SO_2, T.S.P., S. R., SO_4
06	(6)	Brookville - Highway Station - (SO_2 STN) - SO_2, Dust, S.R.
07	(12)	Forest Hills - SO_2, CO, O_3, NO_2, S.R., T.S.P.

CODE		STATIONS AND PARAMETERS
09	(a)	Provincial Hospital - Dust, S.R.
13	(4)	Provincial Building - S.R., T.S.P., SO_4
18		DeMonts Street - SO_2, S.R.
19	(15)	Champlain Heights (Muriel Avenue) - SO_2
20	(6)	Brookville - Bishop's - Dust
21	(e)	Bloomsbury Mountain - S.R.
22	(f)	Rockwood Park - S.R.
23	(g)	Musquash WAtershed Road - S.R.
24	(h)	Ludgate Lake (Swamp) - S.R.
25	(i)	Shadow Lake - S.R.
26	(6)	Brookville - Hill Substation (THG STN) - Dust
		Brookview Crescent - T.S.P.

Note:

In May of 1977, the code numbers used to designate the monitoring stations were changed from a system using numbers and letters to a system using entirely numbers. Because of this change the old code for the stations are shown in brackets following the new code number. The monitoring locations on the map are designated using the new code number. At the same time, two of the Brookville stations were renamed. The old name is shown in brackets next to the new name.



CITY OF SAINT JOHN

Figure 1

Monitoring Stations

5. ABBREVIATIONS

The following is a list of abbreviations and notations used in this report.

pphm - parts per hundred million

ppm - parts per million

ug/m^3 - micrograms per cubic meter

N/A - data not available

* - less than 50% of data valid

L - less than

G - greater than

Stand - standard

6. CONVERSION TO METRIC UNITS

For the annual report, the measuring units used in the monthly reports were converted to metric units where necessary. The conversion factors used were:

SO_2	1 pphm = 26.5 ug/m^3
CO	1 ppm = 1200 ug/m^3
NO_2	1 pphm = 19 ug/m^3
O_3	1 pphm = 20 ug/m^3
H_2S	1 pphm = 14 ug/m^3
DUST	1 $ton/mile^2/month$ = 350.5 $mg/m^2/month$

For comparison purposes, the annual averages of SO_2, CO, NO_2, O_3 and H_2S are shown on the data tables of this report in the units used in the monthly reports as well as in metric units.

Western District Police Station

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	Sulphur Dioxide
	Total Suspended Particulates
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Table 7A4	Suspended Sulphates
Figure 7A1	Concentration of SO_2

TABLE: 7A1

MONITORING LOCATION: Western District Police Station

YEAR: 1981

MONTH	Monthly Averages					
	SO_2 (ug/m^3)	CO (ug/m^3)	O_3 (ug/m^3)	NO_2 (ug/m^3)	H_2S (ug/m^3)	S.R. (mgSO_3/100cm^2/day
JANUARY	11.66	NOT MEASURED	35.0	NOT MEASURED	NOT MEASURED	NOT MEASURED
FEBRUARY	10.34		58.2			
MARCH	22.26					
APRIL	8.75					
MAY	20.67					
JUNE	2.65*					
JULY	7.95					
AUGUST	11.13					
SEPTEMBER	45.85*					
OCTOBER	40.81					
NOVEMBER	40.28					
DECEMBER	37.90					
ANNUAL AVERAGE	21.18 (0.82 pphm)					

Annual Average for T.S.P. = 30.5 ug/m^3 (Geometric Mean)

Annual Average for SO_4 = 1.66 ug/m^3 (Geometric Mean

TABLE: 7A2

FREQUENCY OF EXCEEDANCE OF PROVINCIAL STANDARDS

MONITORING LOCATION: Western District Police Station

MONTH	SO_2 1 Hr. Stand.	SO_2 24 Hr.Stand.	CO 1 Hr. Stand.	H_2S 1 Hr. Stand.	NO_2 1 Hr. Stand.	T.S.P. 24 Hr. Stand.
JANUARY	0	0				0
FEBRUARY	0	0				0
MARCH	0	0				0
APRIL	0	0				0
MAY	0	0				0
JUNE	0*	0*	NOT MEASURED	NOT MEASURED	NOT MEASURED	0
JULY	0	0				0
AUGUST	0	0				0
SEPTEMBER	0*	0*				0
OCTOBER	0	0				0
NOVEMBER	0	0				0
DECEMBER	0	0				0
TOTAL FOR YEAR	0	0				0

TABLE 7A3

TOTAL SUSPENDED PARTICULATES

WESTERN DISTRICT POLICE STATION

Sample No.	Date	T.S.P. ug/m^3	Sample No.	Date	T.S.P. ug/m^3
1	Jan. 4	25.0	31	July 3	N/A
2	" 10	13.0	32	" 9	N/A
3	" 16	N/A	33	" 15	N/A
4	" 22	6.7	34	" 21	49.0
5	" 28	15.0	35	" 27	39.0
6	Feb. 3	44.0	36	Aug. 2	56.0
7	" 9	30.0	37	" 8	29.0
8	" 15	35.0	38	" 14	30.0
9	" 21	28.0	39	" 20	39.0
10	" 27	18.0	40	" 26	26.0
11	Mar. 5	26.0	41	Sept. 1	35.0
12	" 11	27.0	42	" 7	32.0
13	" 17	13.0	43	" 13	41.0
14	" 23	48.0	44	" 19	21.0
15	" 29	51.0	45	" 25	20.0
16	Apr. 4	73.0	46	Oct. 1	30.0
17	" 10	47.0	47	" 7	31.0
18	" 16	46.0	48	" 13	41.0
19	" 22	53.0	49	" 19	35.0
20	" 28	38.0	50	" 25	24.0
21	May 4	22.0	51	" 31	33.0
22	" 10	47.0	52	Nov. 6	38.0
23	" 16	32.0	53	" 12	27.0
24	" 22	43.0	54	" 18	19.0
25	" 28	61.0	55	" 24	33.0
26	June 3	42.0	56	" 30	27.0
27	" 9	37.0	57	Dec. 6	N/A
28	" 15	31.0	58	" 12	24.0
29	" 21	33.0	59	" 18	34.0
30	" 27	17.0	60	" 24	N/A
			61	" 30	13.0

ANNUAL AVERAGE FOR T.S.P. = 30.5 ug/m^3 (GEOMETRIC MEAN)

T.S.P. EXCEEDS THE 24 HOUR PROVINCIAL STANDARD

TABLE 7A4

SUSPENDED SULPHATE

WESTERN DISTRICT POLICE STATION

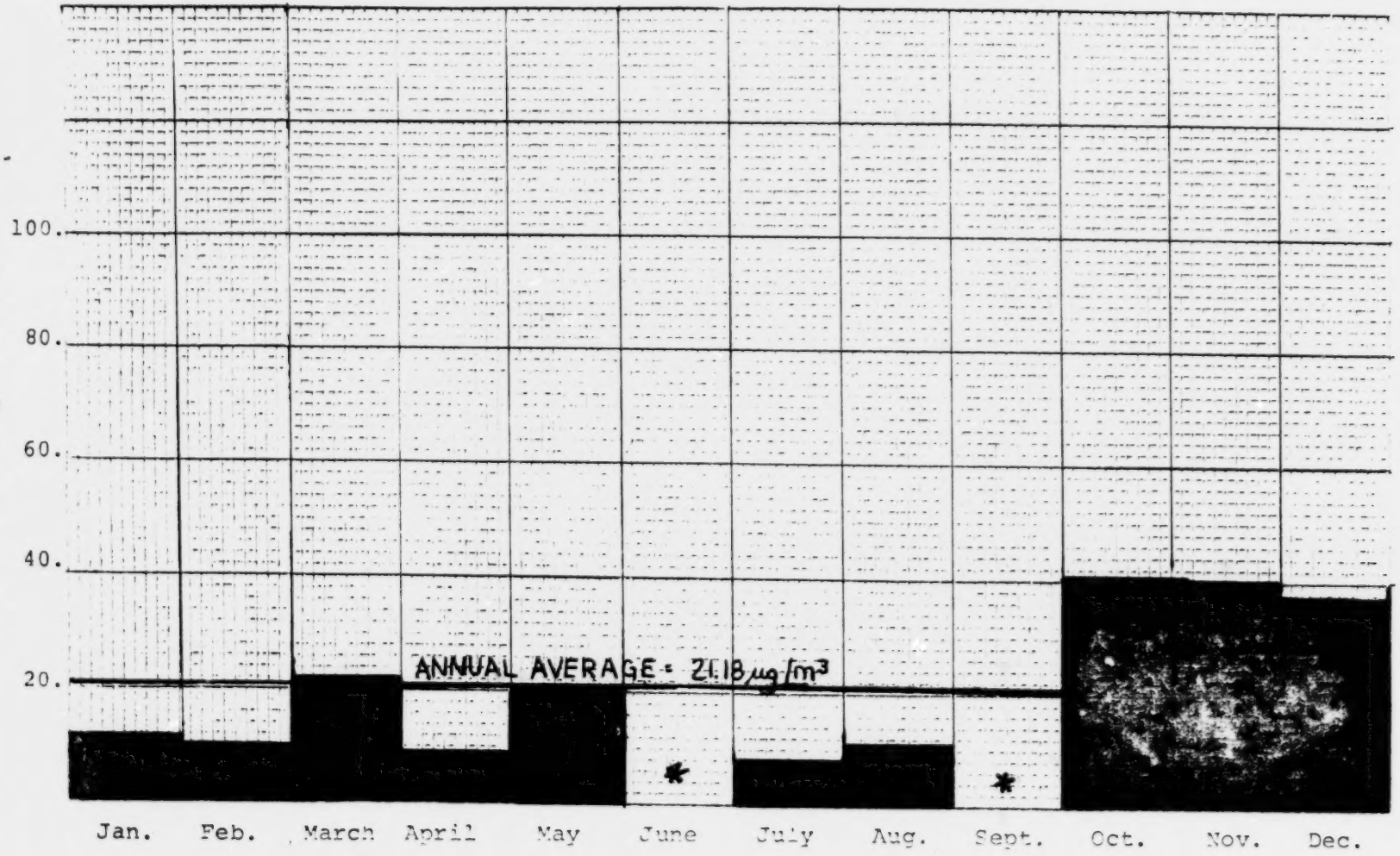
Sample No.	Date	SO_4 ug/m^3	Sample No.	Date	SO_4 ug/m
1	Jan. 4	3.5	31	July 3	N/A
2	" 10	L 12.0	32	" 9	N/A
3	" 16	N/A	33	" 15	N/A
4	" 22	L .48	34	" 21	2.8
5	" 28	0.73	35	" 27	.98
6	Feb. 3	1.1	36	Aug. 2	3.7
7	" 9	2.1	37	" 8	0.7
8	" 15	3.0	38	" 14	0.57
9	" 21	4.4	39	" 20	0.64
10	" 27	1.6	40	" 26	1.8
11	Mar. 5	2.0	41	Sept. 1	3.4
12	" 11	1.7	42	" 7	.92
13	" 17	1.7	43	" 13	4.0
14	" 23	3.9	44	" 19	1.4
15	" 29	5.2	45	" 25	.78
16	Apr. 4	4.8	46	Oct. 1	1.0
17	" 10	2.7	47	" 7	3.0
18	" 16	6.0	48	" 13	4.3
19	" 22	1.9	49	" 19	2.6
20	" 28	3.2	50	" 25	2.3
21	May 4	.91	51	" 31	1.4
22	" 10	3.3	52	Nov. 6	2.4
23	" 16	1.8	53	" 12	L 0.66
24	" 22	.54	54	" 18	1.2
25	" 28	N/A	55	" 24	L 0.53
26	June 3	1.1	56	" 30	L 0.54
27	" 9	2.0	57	Dec. 6	N/A
28	" 15	1.5	58	" 12	1.2
29	" 21	1.7	59	" 18	1.0
30	" 27	0.5	60	" 24	N/A
			61	" 30	0.57

ANUAL AVERAGE FOR SO_4 = 1.66 ug/m^3 (GEOMETRIC MEAN)

FIGURE: 7A1

STATION: WESTERN DISTRICT POLICE STATION

CONCENTRATION OF SO_2



Millidgeville

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Sulphur Dioxide

Sulphation Rate

Table 7B2 Frequency of Exceedance of Provincial Standards

Sulphur Dioxide

Total Suspended Particulates

Table 7B3 Total Suspended Particulates

Figure 7B1 Concentration of SO_2

TABLE: 7B1

MONITORING LOCATION: Millidgeville

YEAR: 1981

MONTH	Monthly Averages					
	SO_2 (ug/m^3)	CO (ug/m^3)	O_3 (ug/m^3)	NO_2 (ug/m^3)	H_2S (ug/m^3)	S.R. ($mgSO_3$/100cm^2/day)
JANUARY	15.64	NOT MEASURED	NOT MEASURED	NOT MEASURED	NOT MEASURED	.19
FEBRUARY	25.18					.34
MARCH	13.25					.29
APRIL	8.23					.21
MAY	21.73					.31
JUNE	23.59*					.45
JULY	13.25					.31
AUGUST	24.12					.48
SEPTEMBER	9.54*					.55
OCTOBER	13.25					.21
NOVEMBER	6.36					.18
DECEMBER	8.75					N/A
ANNUAL AVERAGE	14.98 (0.58 pphm)					.32

Annual Average for T.S.P. = 38.5 ug/m^3 (Geometric Mean)

TABLE: 7B2

FREQUENCY OF EXCEEDANCE OF PROVINCIAL STANDARDS

MONITORING LOCATION: Millidgeville

MONTH	SO_2 1 Hr. Stand.	SO_2 24 Hr.Stand.	CO 1 Hr. Stand.	H_2S 1 Hr. Stand.	NO_2 1 Hr. Stand.	T.S.P. 24 Hr. Stand.
JANUARY	0	0				0
FEBRUARY	0	0				0
MARCH	0	0				0
APRIL	0	0				0
MAY	0	0				1
JUNE	0*	0*				0
JULY	0	0				0
AUGUST	0	0				0
SEPTEMBER	0*	0*				0
OCTOBER	2	0				0
NOVEMBER	0	0				0
DECEMBER	0	0				0
TOTAL FOR YEAR	2	0				1

TABLE 7B3

TOTAL SUSPENDED PARTICULATES

MILLIDGEVILLE

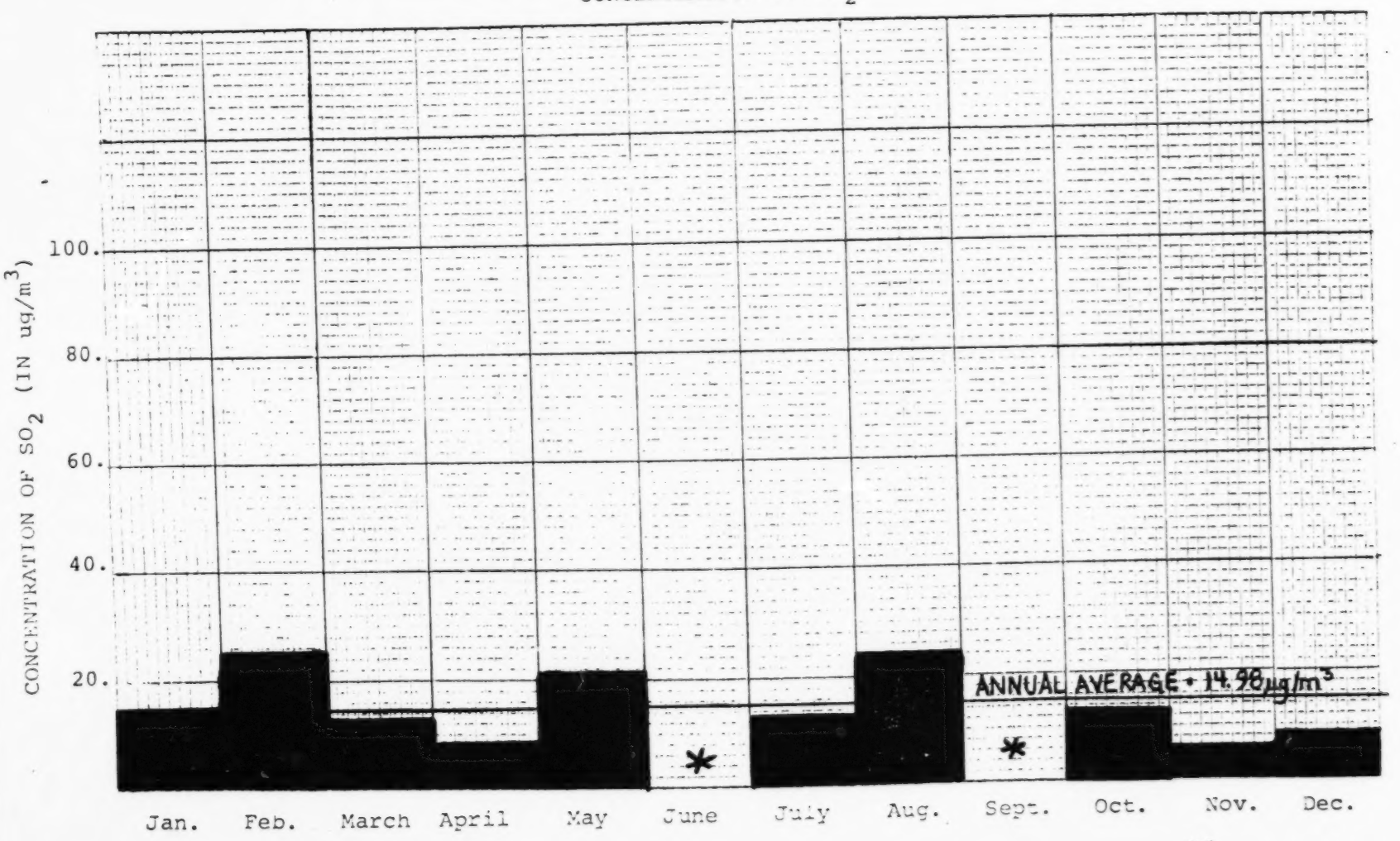
Sample No.	Date	T.S$_3$P. ug/m^3	Sample No.	Date	T.S$_3$P. ug/m^3
1	Jan. 4	N/A	31	July 3	34.0
2	" 10	23.0	32	" 9	50.0
3	" 16	37.0	33	" 15	45.0
4	" 22	27.0	34	" 21	34.0
5	" 28	33.0	35	" 27	30.0
6	Feb. 3	46.0	36	Aug. 2	55.0
7	" 9	N/A	37	" 8	22.0
8	" 15	N/A	38	" 14	33.0
9	" 21	42.0	39	" 20	36.0
10	" 27	80.0	40	" 26	29.0
11	Mar. 5	82.0	41	Sept. 1	47.0
12	" 11	90.0	42	" 7	41.0
13	" 17	17.0	43	" 13	41.0
14	" 23	N/A	44	" 19	21.0
15	" 29	N/A	45	" 25	48.0
16	Apr. 4	N/A	46	Oct. 1	45.0
17	" 10	N/A	47	" 7	20.0
18	" 16	110.0	48	" 13	45.0
19	" 22	32.0	49	" 19	47.0
20	" 28	N/A	50	" 25	27.0
21	May 4	N/A	51	" 31	51.0
22	" 10	140.0*	52	Nov. 6	30.0
23	" 16	N/A	53	" 12	41.0
24	" 22	N/A	54	" 18	14.0
25	" 28	N/A	55	" 24	44.0
26	June 3	N/A	56	" 30	69.0
27	" 9	N/A	57	Dec. 6	28.0
28	" 15	33.0	58	" 12	24.0
29	" 21	19.0	59	" 18	97.0
30	" 27	22.0	60	" 24	N/A
			61	" 30	39.0

Annual Average For T.S.P. = 38.5 ug/m^3 (Geometric Mean)

TSP Exceeds the 24 Hour Provincial Standard

FIGURE: 7B1

STATION: MILLIDGEVILLE



Post Office

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Sulphur Dioxide

Carbon Monoxide

Ozone

Nitrogen Dioxide

Table 7C2 Frequency of Exceedance of Provincial Standards

Sulphur Dioxide

Carbon Monoxide

Nitrogen Dioxide

Figure 7C1 Concentration of SO_2

Figure 7C2 Concentration of CO

Figure 7C3 Concnetration of O_3

Figure 7C4 Concentration of NO_2

TABLE: 7C1

MONITORING LOCATION: Post Office

YEAR: 1981

MONTH	Monthly Averages					
	SO_2 (ug/m^3)	CO (ug/m^3)	O_3 (ug/m^3)	NO_2 (ug/m^3)	H_2S (ug/m^3)	S.R. (mgSO_3/100cm^2/day)
JANUARY	29.68	1056.0	30.6	3.42	NOT MEASURED	NOT MEASURED
FEBRUARY	58.57	552.0	29.0	3.32		
MARCH	52.21	276.0	32.0	1.90		
APRIL	27.83	228.0	44.4	1.14		
MAY	6.36*	192.0*	39.0*	3.23*		
JUNE	43.46*	84.0	49.4	7.98		
JULY	25.44*	60.0*	41.4	54.72		
AUGUST	19.08	72.0	52.6	65.55		
SEPTEMBER	5.04*	168.0*	42.0*	33.06*		
OCTOBER	23.32*	288.0	28.4	57.95		
NOVEMBER	41.34	480.0	25.8	51.49		
DECEMBER	45.58	876.0	18.6	62.89		
ANNUAL AVERAGE	39.18 (1.48 pphm)	397.2 (0.33 pphm)	35.22 (1.76 pphm)	31.04 (1.63 pphm)		

TABLE: 7C2

FREQUENCY OF EXCEEDANCE OF PROVINCIAL STANDARDS

MONITORING LOCATION: Post Office

MONTH	SO_2 1 Hr. Stand.	SO_2 24 Hr.Stand.	CO 1 Hr. Stand.	H_2S 1 Hr. Stand.	NO_2 1 Hr. Stand.	T.S.P. 24 Hr. Stand.
JANUARY	0	0	0	NOT MEASURED	0	NOT MEASURED
FEBRUARY	0	0	0		0	
MARCH	0	0	0		0	
APRIL	0	0	0		0	
MAY	0*	0*	0*		0*	
JUNE	0*	0*	0		0	
JULY	0*	0*	0		0	
AUGUST	0	0	0		0	
SEPTEMBER	0*	0*	0*		0*	
OCTOBER	0*	0*	0		0	
NOVEMBER	0	0	0		1	
DECEMBER	0	0	0		5	
TOTAL FOR YEAR	0	0	0		6	

FIGURE: 7C1

STATION: POST OFFICE

CONCENTRATION OF SO_2

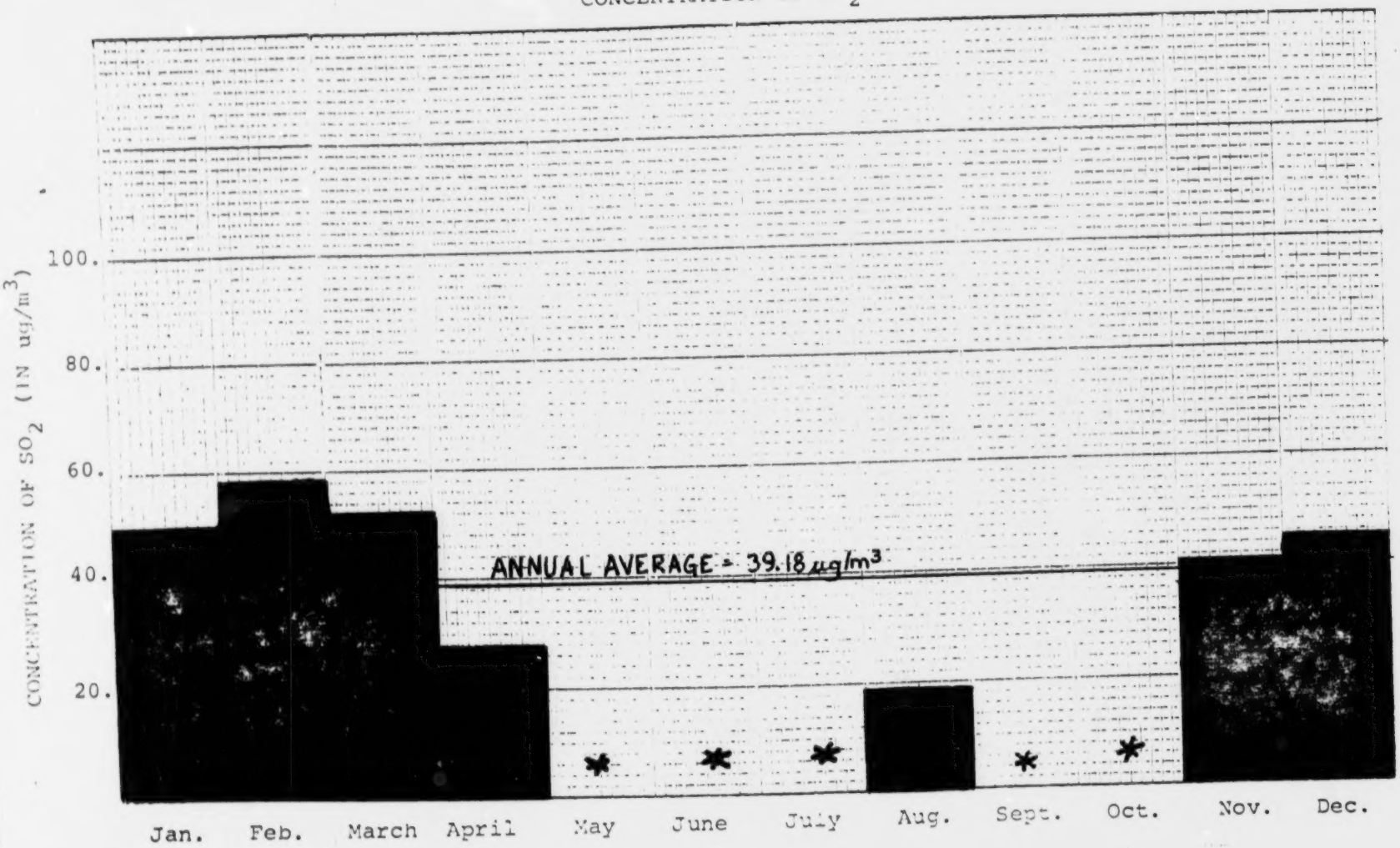


FIGURE: 7C2

STATION: POST OFFICE

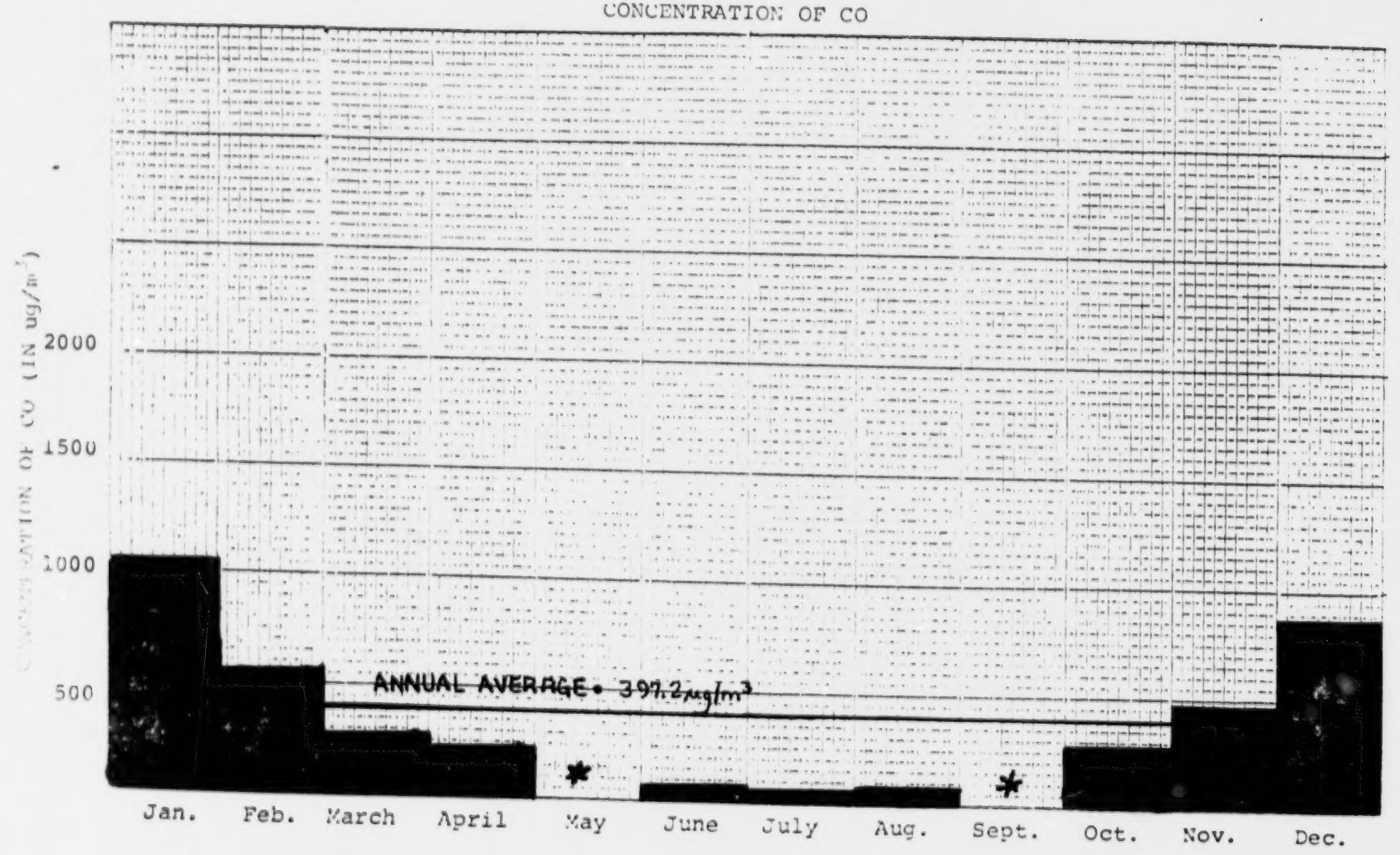


FIGURE: 7C3

STATION: POST OFFICE

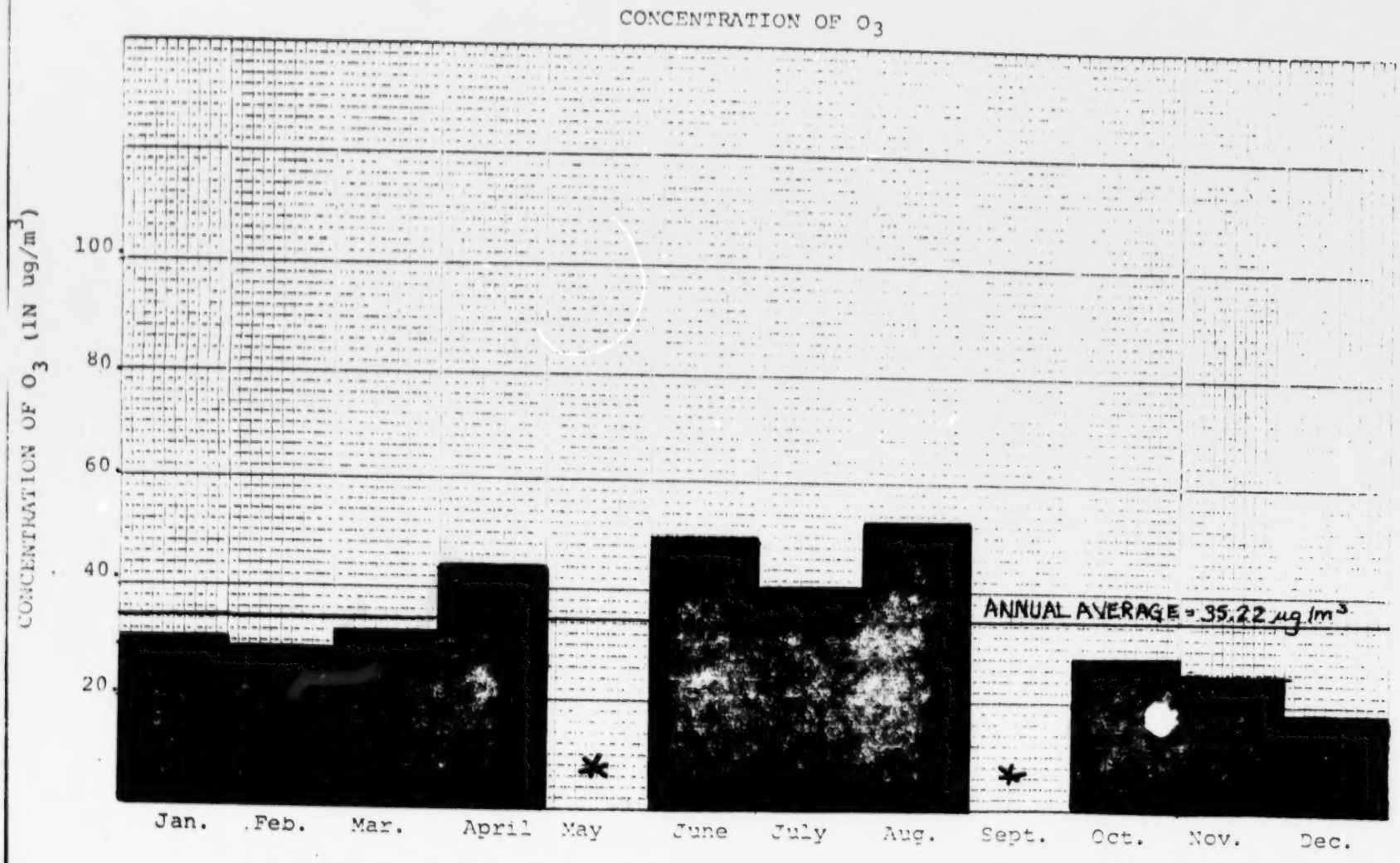
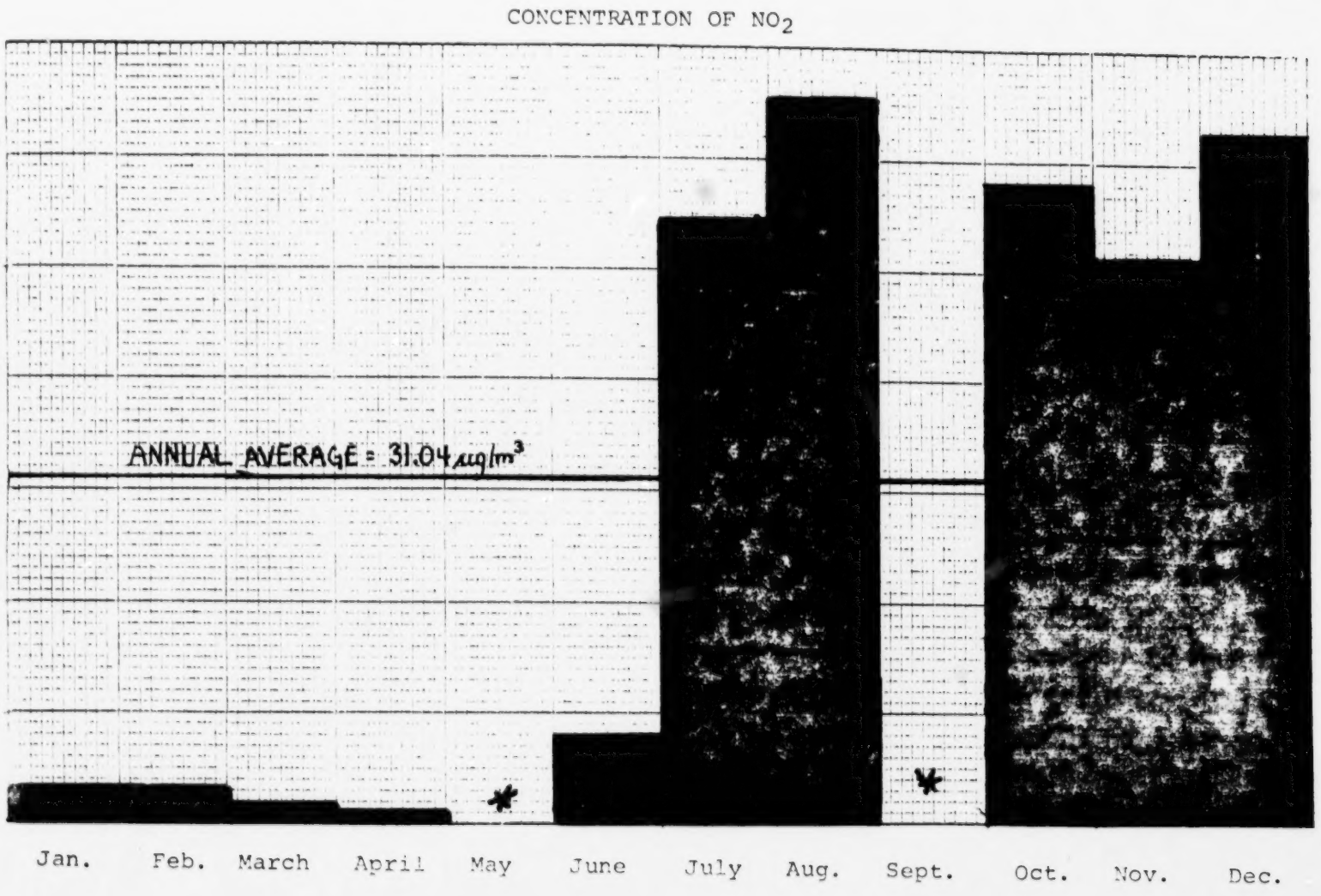


FIGURE: 7C4 STATION: POST OFFICE



Red Head

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Table 7D2	Frequency of Exceedance of Provincial Standards
	Sulphur Dioxide
	Total Suspended Particulates
Table 7D3	Total Suspended Particulates
Table 7D4	Suspended Sulphates
Figure 7D1	Concentration of SO_2

TABLE: 7D1

MONITORING LOCATION: Red Head

YEAR: 1981

MONTH	Monthly Averages					
	SO_2 (ug/m^3)	CO (ug/m^3)	O_3 (ug/m^3)	NO_2 (ug/m^3)	H_2S (ug/m^3)	S.R. (mgSO_3/100cm^2/day)
JANUARY	8.75	NOT MEASURED	NOT MEASURED	NOT MEASURED	NOT MEASURED	.54
FEBRUARY	14.84					.37
MARCH	17.49					.42
APRIL	10.07					.37
MAY	3.71					.10
JUNE	5.30*					.29
JULY	9.81					.27
AUGUST	5.57					.21
SEPTEMBER	16.70*					N/A
OCTOBER	45.05*					.36
NOVEMBER	49.29*					.51
DECEMBER	35.51					.56
ANNUAL AVERAGE	13.22 (0.5 pphm)					.36

Annual Average for T.S.P. = 32.7 ug/m^3 (Geometric Mean)

Annual Average for SO_4 = 2.52 ug/m^3 (Geometric Mean)

TABLE: 7D2

FREQUENCY OF EXCEEDANCE OF PROVINCIAL STANDARDS

MONITORING LOCATION: Red Head

MONTH	SO_2 1 Hr. Stand.	SO_2 24 Hr.Stand.	CO 1 Hr. Stand.	H_2S 1 Hr. Stand.	NO_2 1 Hr. Stand.	T.S.P. 24 Hr. Stand.
JANUARY	0	0				0
FEBRUARY	0	0				0
MARCH	0	0				0
APRIL	0	0				0
MAY	0	0				0
JUNE	0*	0*				0
JULY	0	0				0
AUGUST	0	0				0
SEPTEMBER	0*	0*				0
OCTOBER	0*	0*				0
NOVEMBER	0*	0*				0
DECEMBER	1	0				0
TOTAL FOR YEAR	1	0				0

TABLE 7D3

TOTAL SUSPENDED PARTICULATES

RED HEAD

Sample No.	Date	T.S.P. ug/m^3	Sample No.	Date	T.S.P. ug/m^3
1	Jan. 4	N/A	31	July 3	12.0
2	" 10	N/A	32	" 9	53.0
3	" 16	N/A	33	" 15	33.0
4	" 22	N/A	34	" 21	33.0
5	" 28	51.0	35	" 27	40.0
6	Feb. 3	62.0	36	Aug. 2	45.0
7	" 9	37.0	37	" 8	22.0
8	" 15	33.0	38	" 14	30.0
9	" 21	83.0	39	" 20	17.0
10	" 27	N/A	40	" 26	23.0
11	Mar. 5	N/A	41	Sept. 1	21.0
12	" 11	N/A	42	" 7	36.0
13	" 17	26.0	43	" 13	52.0
14	" 23	N/A	44	" 19	16.0
15	" 29	70.0	45	" 25	25.0
16	Apr. 4	63.0	46	Oct. 1	25.0
17	" 10	35.0	47	" 7	27.0
18	" 16	84.0	48	" 13	40.0
19	" 22	32.0	49	" 19	49.0
20	" 28	28.0	50	" 25	29.0
21	May 4	N/A	51	" 31	30.0
22	" 10	32.0	52	Nov. 6	25.0
23	" 16	30.0	53	" 12	32.0
24	" 22	N/A	54	" 18	20.0
25	" 28	49.0	55	" 24	39.0
26	June 3	27.0	56	" 30	32.0
27	" 9	33.0	57	Dec. 6	28.0
28	" 15	22.0	58	" 12	40.0
29	" 21	28.0	59	" 18	40.0
30	" 27	29.0	60	" 24	N/A
			61	" 30	15.0

ANNUAL AVERAGE FOR T.S.P. = 32.7 ug/m^3 (GEOMETRIC MEAN)

T.S.P. EXCEEDS THE 24 HOUR PROVINCIAL STANDARD

TABLE 7D4

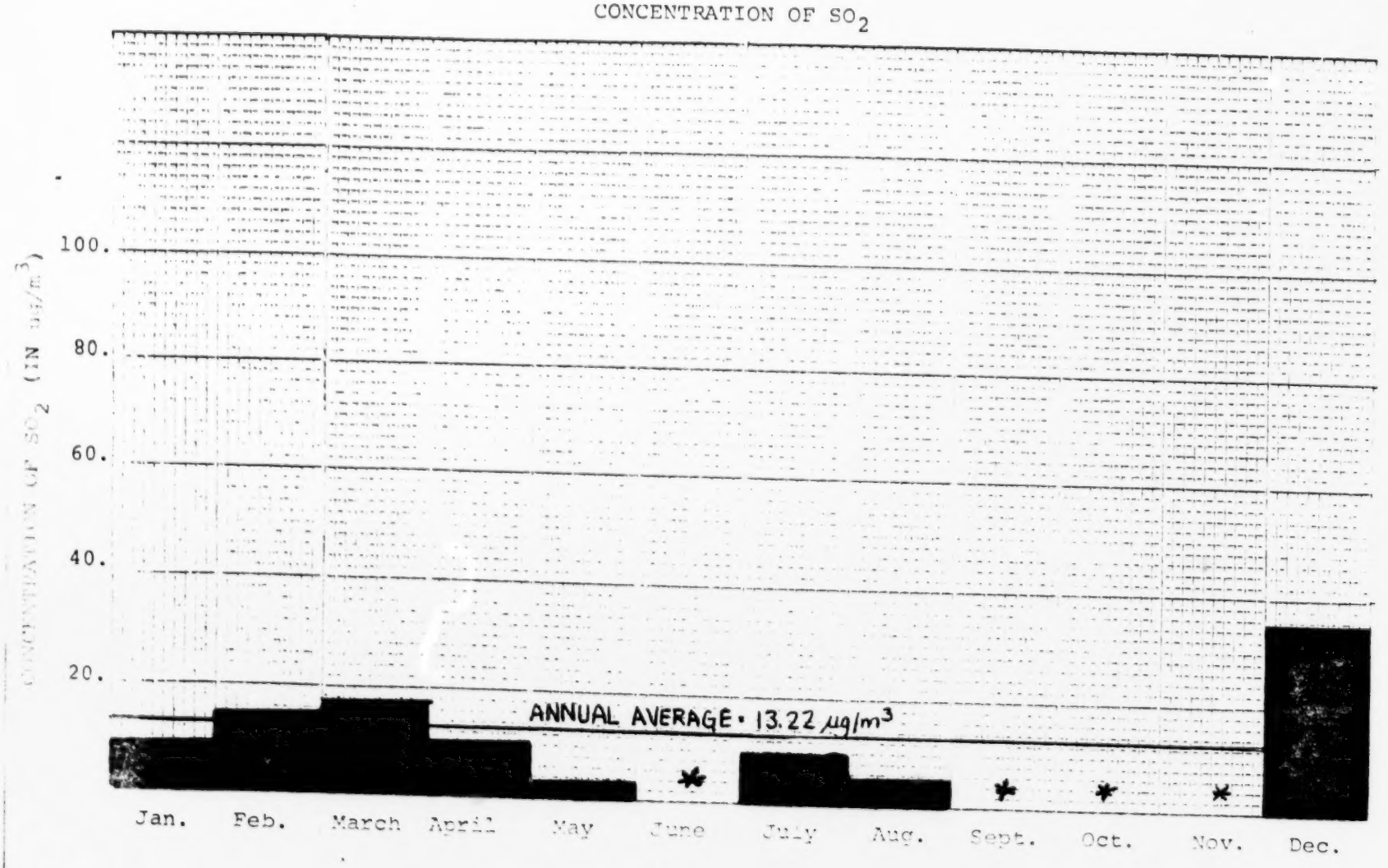
SUSPENDED SULPHATES

RED HEAD

Sample No.	Date	SO_4 ug/m^3	Sample No.	Date	SO_4 ug/m^3
1	Jan. 4	N/A	31	July 3	0.6
2	" 10	N/A	32	" 9	1.5
3	" 16	N/A	33	" 15	0.7
4	" 22	N/A	34	" 21	6.0
5	" 28	5.7	35	" 27	2.9
6	Feb. 3	2.1	36	Aug. 2	3.3
7	" 9	2.7	37	" 8	1.7
8	" 15	7.6	38	" 14	0.62
9	" 21	4.6	39	" 20	0.57
10	" 27	N/A	40	" 26	0.60
11	Mar. 5	N/A	41	Sept. 1	1.8
12	" 11	N/A	42	" 7	2.2
13	" 17	2.5	43	" 13	8.4
14	" 23	N/A	44	" 19	1.2
15	" 29	7.7	45	" 25	5.7
16	Apr. 4	4.3	46	Oct. 1	2.8
17	" 10	2.0	47	" 7	3.2
18	" 16	13.0	48	" 13	6.6
19	" 22	1.5	49	" 19	3.9
20	" 28	3.0	50	" 25	3.2
21	May 4	N/A	51	" 31	1.7
22	" 10	7.3	52	Nov. 6	2.1
23	" 16	.94	53	" 12	2.7
24	" 22	N/A	54	" 18	1.1
25	" 28	10.0	55	" 24	2.0
26	June 3	.6	56	" 30	3.9
27	" 9	4.1	57	Dec. 6	1.4
28	" 15	1.6	58	" 12	13.0
29	" 21	4.7	59	" 18	6.0
30	" 27	0.84	60	" 24	N/A
			61	" 30	L .55

ANNUAL AVERAGE FOR SO_4 = 2.52 ug/m^3 (GEOMETRIC MEAN)

FIGURE: 7D1 STATION: RED HEAD



FOREST HILLS

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Table 7E1 Averaged Data
- Sulphur Dioxide
- Carbon Monoxide
- Ozone
- Nitrogen Dioxide
- Sulphation Rate

Table 7E2 Frequency of Exceedance of Provincial Standards
- Sulphur Dioxide
- Carbon Monoxide
- Nitrogen Dioxide
- Total Suspended Particulates

Table 7E3 Total Suspended Particulates

Figure 7E1 Concentration of SO_2

Figure 7E2 Concentration of CO

Figure 7E3 Concentration of O_3

Figure 7E4 Concentration of NO_2

TABLE: 7E1

MONITORING LOCATION: Forest Hills

YEAR: 1981

MONTH	Monthly Averages					
	SO_2 (ug/m^3)	CO (ug/m^3)	O_3 (ug/m^3)	NO_2 (ug/m^3)	H_2S (ug/m^3)	S.R. (mgSO_3/100cm^2/day)
JANUARY	9.28	936.0	42.8	NOT MEASURED	NOT MEASURED	.28
FEBRUARY	18.55	552.0	49.4			.51
MARCH	16.70	252.0	58.0			.32
APRIL	31.54	372.0	63.0			1.2
MAY	58.04	468.0	61.0			.48
JUNE	62.28	180.0	45.2			1.0
JULY	102.82	612.0	39.2			.97
AUGUST	109.45	588.0	44.4			1.1
SEPTEMBER	2.39*	684.0*	37.8*			.56
OCTOBER	37.63	564.0	33.4			.57
NOVEMBER	22.79	252.0	33.4			.31
DECEMBER	19.35	336.0	27.6			N/A
ANNUAL AVERAGE	44.4 (1.68pphm)	464.7 (0.39 ppm)	45.22 (2.38 pphm)			.66

Annual Average for T.S.P. = 38.5 ug/m^3 (Geometric Mean)

TABLE: 7E2

FREQUENCY OF EXCEEDANCE OF PROVINCIAL STANDARDS

MONITORING LOCATION: Forest Hills

MONTH	SO_2 1 Hr. Stand.	SO_2 24 Hr.Stand.	CO 1 Hr. Stand.	H_2S 1 Hr. Stand.	NO_2 1 Hr. Stand.	T.S.P. 24 Hr. Stand.
JANUARY	0	0	0	NOT MEASURED	N/A	0
FEBRUARY	0	0	0		N/A	0
MARCH	0	0	0		N/A	0
APRIL	0	0	0		N/A	0
MAY	0	0	0		N/A	0
JUNE	0	1	0		N/A	0
JULY	3	1	0		N/A	0
AUGUST	0	1	0		N/A	0
SEPTEMBER	0*	0*	0*		N/A	0
OCTOBER	2	0	0		N/A	0
NOVEMBER	0	0	0		N/A	0
DECEMBER	0	0	0		N/A	0
TOTAL FOR YEAR	5	3	0			0

TABLE 7E3 TOTAL SUSPENDED PARTICULATES

FOREST HILLS

Sample No.	Date	TSP ug/m^3	Sample No.	Date	TSP ug/m^3
1	Jan. 4	N/A	31	July 3	66.0
2	" 10	N/A	32	" 9	72.0
3	" 16	N/A	33	" 15	33.0
4	" 22	41.0	34	" 21	33.0
5	" 28	3.3	35	" 27	31.0
6	Feb. 3	58.0	36	Aug. 2	110.0
7	" 9	35.0	37	" 8	34.0
8	" 15	31.0	38	" 14	79.0
9	" 21	16.0	39	" 20	N/A
10	" 27	37.0	40	" 26	N/A
11	Mar. 5	56.0	41	Sept. 1	54.0
12	" 11	67.0	42	" 7	28.0
13	" 17	24.0	43	" 13	55.0
14	" 23	51.0	44	" 19	17.0
15	" 29	57.0	45	" 25	35.0
16	Apr. 4	92.0	46	Oct. 1	27.0
17	" 10	71.0	47	" 7	20.0
18	" 16	60.0	48	" 13	43.0
19	" 22	60.0	49	" 19	47.0
20	" 28	70.0	50	" 25	32.0
21	May 4	31.0	51	" 31	42.0
22	" 10	71.0	52	Nov. 6	27.0
23	" 16	50.0	53	" 12	24.0
24	" 22	N/A	54	" 18	16.0
25	" 28	63.0	55	" 24	23.0
26	June 3	74.0	56	" 30	55.0
27	" 9	32.0	57	Dec. 6	21.0
28	" 15	32.0	58	" 12	36.0
29	" 21	21.0	59	" 18	56.0
30	" 27	31.0	60	" 24	N/A
			61	" 30	29.0

Annual Average for T.S.P. = 38.5 ug/m^3 (Geometric Mean)

#T.S.P. Exceeds the 24 Hour Provincial Standard

FIGURE: 7E1 STATION: FOREST HILLS

CONCENTRATION OF SO_2

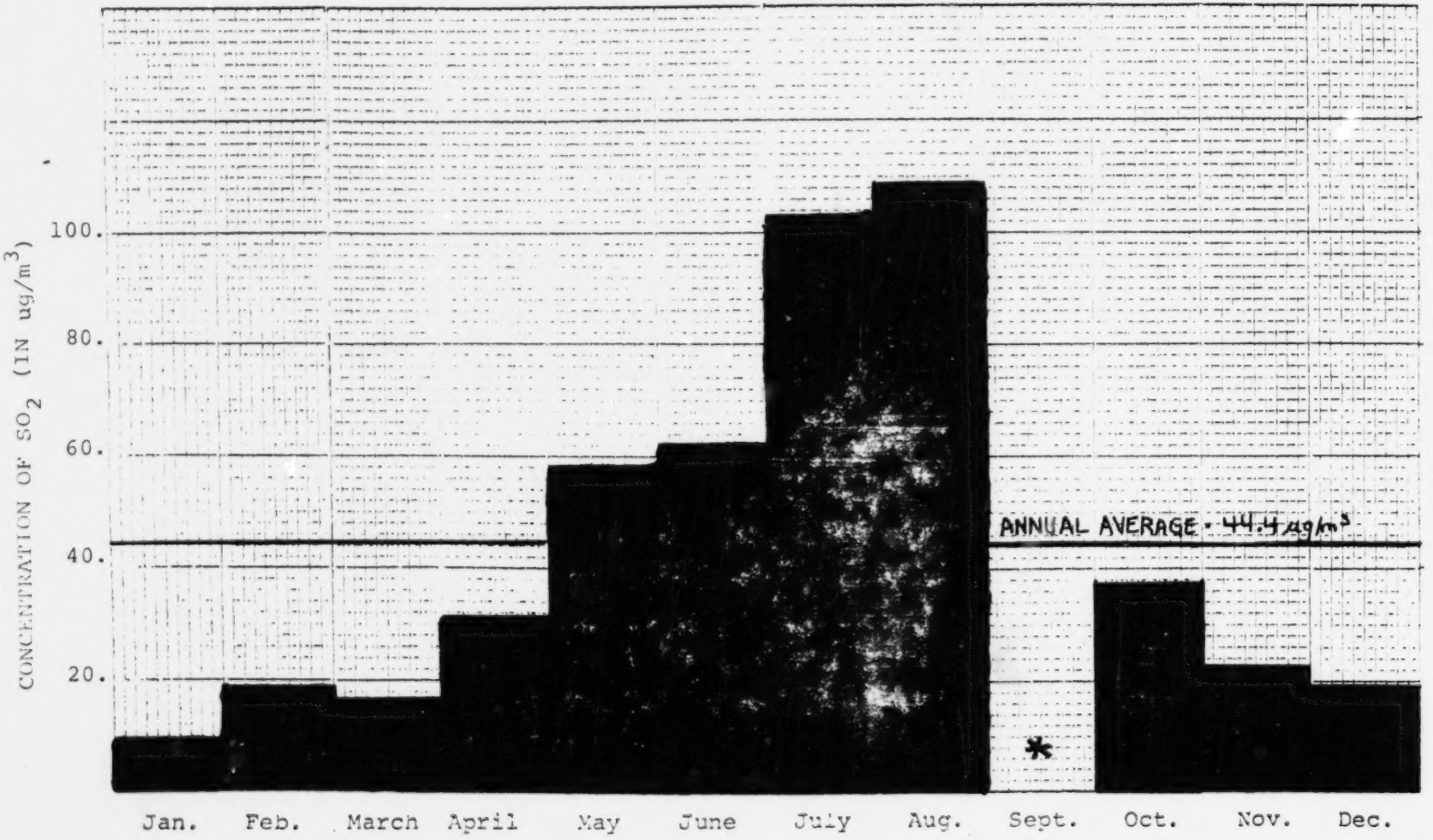


FIGURE: 7E2 STATION: FOREST HILLS

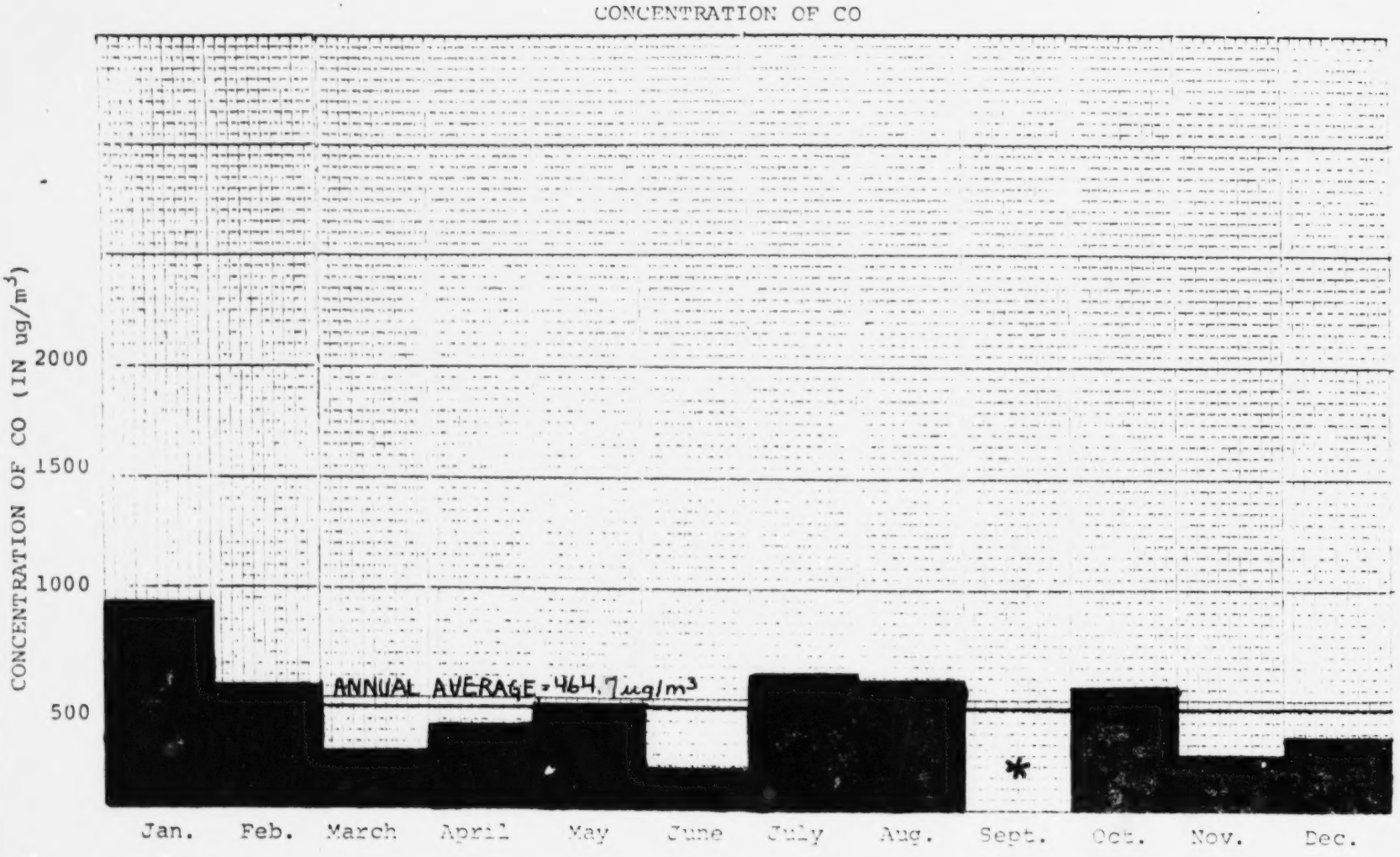
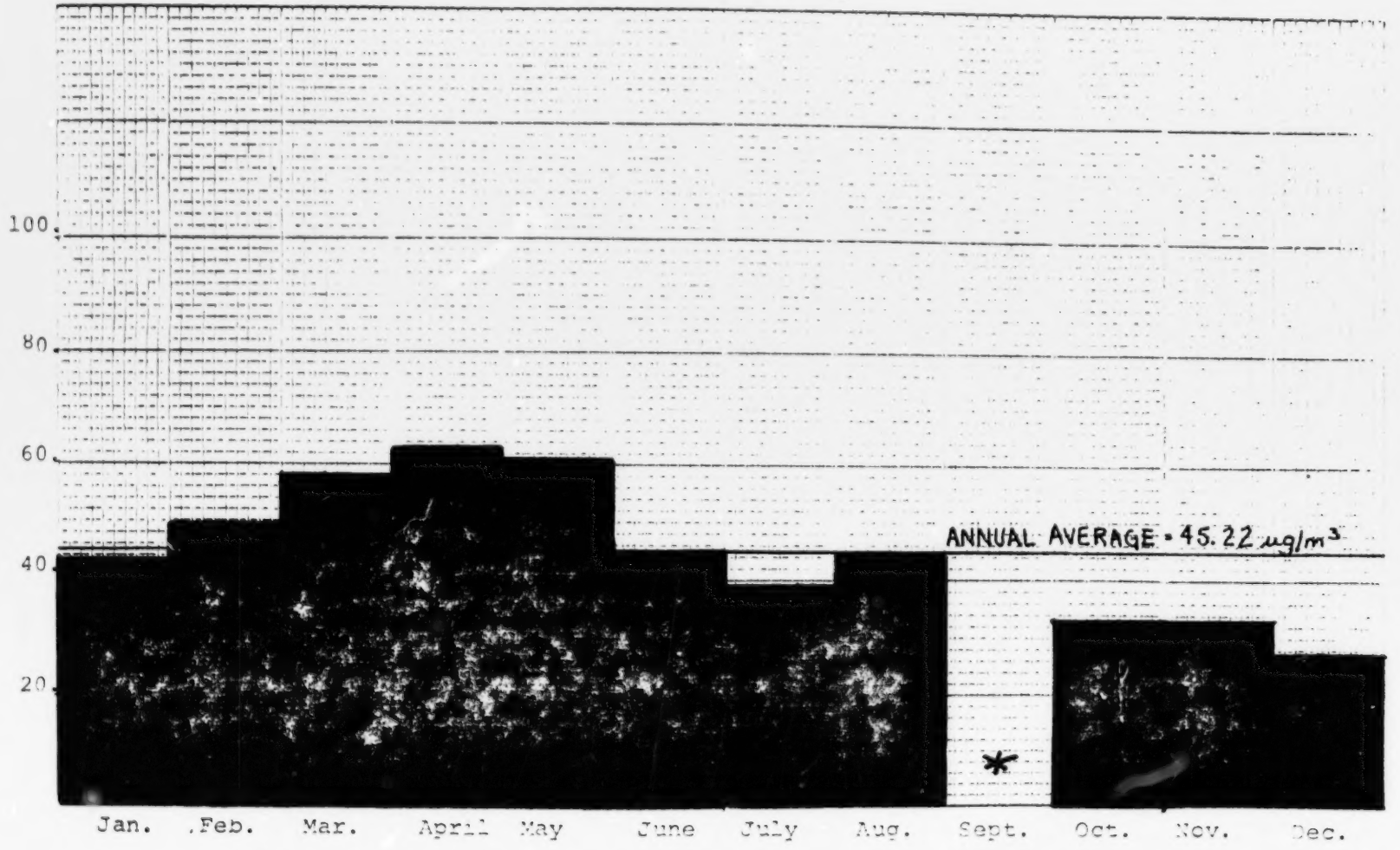


FIGURE: 7E3 STATION: FOREST HILLS

CONCENTRATION OF O_3



Provincial Building

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Table 7F1 Sulphation Rate

Frequency of Exceedance of Provincial Standard

Total Suspended Particulates

Table 7F2 Total Suspended Particulates

Table 7F3 Suspended Sulphates

TABLE: 7F1

MONITORING LOCATION: PROVINCIAL BUILDING

YEAR: 1981

ANNUAL AVERAGE FOR T.S.P. = 57.2ug/m^3 (GEOMETRIC MEAN)

ANNUAL AVERAGE FOR SO_4 = 3.89ug/m^3 (GEOMETRIC MEAN)

MONTH	S.R. ($mgSO_3/100cm^2/day$)	FREQUENCY OF EXCEEDANCE OF PROVINCIAL STANDARD FOR T.S.P. (24 Hr. STANDARD)
JANUARY	.99	0
FEBRUARY	.84	0
MARCH	N/A	0
APRIL	N/A	2
MAY	N/A	0
JUNE	1.1	0
JULY	.43	0
AUGUST	.48	0
SEPTEMBER	.66	0
OCTOBER	1.0	0
NOVEMBER	1.1	0
DECEMBER	1.5	0
ANNUAL AVERAGE	0.90	TOTAL 2

TABLE 7F2

SUSPENDED PARTICULATES

PROVINCIAL BUILDING

Sample No.	Date	T.S.P. ug/m^3	Sample No.	Date	T.S.P. ug/m^3
1	Jan. 4	40.0	31	July 3	52.0
2	" 10	44.0	32	" 9	71.0
3	" 16	79.0	33	" 15	73.0
4	" 22	39.0	34	" 21	85.0
5	" 28	64.0	35	" 27	50.0
6	Feb. 3	55.0	36	Aug. 2	75.0
7	" 9	N/A	37	" 8	36.0
8	" 15	52.0	38	" 14	59.0
9	" 21	50.0	39	" 20	46.0
10	" 27	100.0	40	" 26	38.0
11	Mar. 5	110.0	41	Sept. 1	69.0
12	" 11	98.0	42	" 7	51.0
13	" 17	46.0	43	" 13	72.0
14	" 23	N/A	44	" 19	42.0
15	" 29	N/A	45	" 25	42.0
16	Apr. 4	120.0	46	Oct. 1	49.0
17	" 10	100.0	47	" 7	35.0
18	" 16	53.0	48	" 13	72.0
19	" 22	90.0	49	" 19	71.0
20	" 28	120.0	50	" 25	41.0
21	May 4	N/A	51	" 31	61.0
22	" 10	52.0	52	Nov. 6	45.0
23	" 16	49.0	53	" 12	45.0
24	" 22	79.0	54	" 18	32.0
25	" 28	74.0	55	" 24	67.0
26	June 3	70.0	56	" 30	42.0
27	" 9	51.0	57	Dec. 6	46.0
28	" 15	43.0	58	" 12	59.0
29	" 21	48.0	59	" 18	74.0
30	" 27	42.0	60	" 24	N/A
			61	" 30	28.0

ANNUAL AVERAGE FOR T.S.P. = 57.2 ug/m^3 (GEOMETRIC MEAN)

T.S.P. EXCEEDS THE 24 HOUR PROVINCIAL STANDARD

TABLE 7F3

SUSPENDED SULPHATE

PROVINCIAL BUILDING

Sample No.	Date	SO_4 ug/m^3	Sample No.	Date	SO_4 ug/m^3
1	Jan. 4	8.7	31	July 3	1.6
2	" 10	7.5	32	" 9	2.7
3	" 16	15.0	33	" 15	1.1
4	" 22	L .56	34	" 21	15.1
5	" 28	6.8	35	" 27	5.3
6	Feb. 3	1.1	36	Aug. 2	8.2
7	" 9	N/A	37	" 8	1.6
8	" 15	6.3	38	" 14	0.94
9	" 21	4.3	39	" 20	0.97
10	" 27	4.0	40	" 26	2.7
11	Mar. 5	5.4	41	Sept. 1	6.8
12	" 11	6.1	42	" 7	4.1
13	" 17	5.3	43	" 13	8.8
14	" 23	N/A	44	" 19	2.8
15	" 29	N/A	45	" 25	2.2
16	Apr. 4	3.4	46	Oct. 1	2.6
17	" 10	3.2	47	" 7	5.4
18	" 16	5.0	48	" 13	12.0
19	" 22	2.8	49	" 19	8.5
20	" 28	11.0	50	" 25	8.2
21	May 4	N/A	51	" 31	6.9
22	" 10	1.7	52	Nov. 6	6.3
23	" 16	2.5	53	" 12	3.5
24	" 22	2.5	54	" 18	1.6
25	" 28	12.0	55	" 24	1.9
26	June 3	4.5	56	" 30	0.84
27	" 9	3.9	57	Dec. 6	6.2
28	" 15	3.5	58	" 12	12.0
29	" 21	3.9	59	" 18	6.8
30	" 27	1.7	60	" 24	N/A
			61	" 30	N/A

ANNUAL AVERAGE FOR SO_4 = 3.89 ug/m^3 (GEOMETRIC MEAN)

DeMonts Street

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Table 7G1 Averaged Data

Sulphur Dioxide

Hydrogen Sulphide

Sulphation Rate

Table 7G2 Frequency of Exceedance of Provincial Standards

Hydrogen Sulphide

Figure 7G1 Concentration of H_2S

TABLE: 7G1

MONITORING LOCATION: DeMonts Street

YEAR: 1981

MONTH	Monthly Averages					
	SO_2 (ug/m^3)	CO (ug/m^3)	O_3 (ug/m^3)	NO_2 (ug/m^3)	H_2S (ug/m^3)	S.R. (mgSO_3/100cm^2/day)
JANUARY	N/A	NOT MEASURED	NOT MEASURED	NOT MEASURED	.42	.65
FEBRUARY	N/A				N/A	.30
MARCH	N/A				N/A	.58
APRIL	N/A				.70*	1.1
MAY	N/A				.14	.22
JUNE	N/A				.28*	.41
JULY	N/A				.28	.7
AUGUST	N/A				.28	.17
SEPTEMBER	N/A				1.96*	.25
OCTOBER	N/A				.42	.37
NOVEMBER	N/A				1.54	.60
DECEMBER	N/A				1.40	.40
ANNUAL AVERAGE	N/A				0.64 (.05pphm)	.48

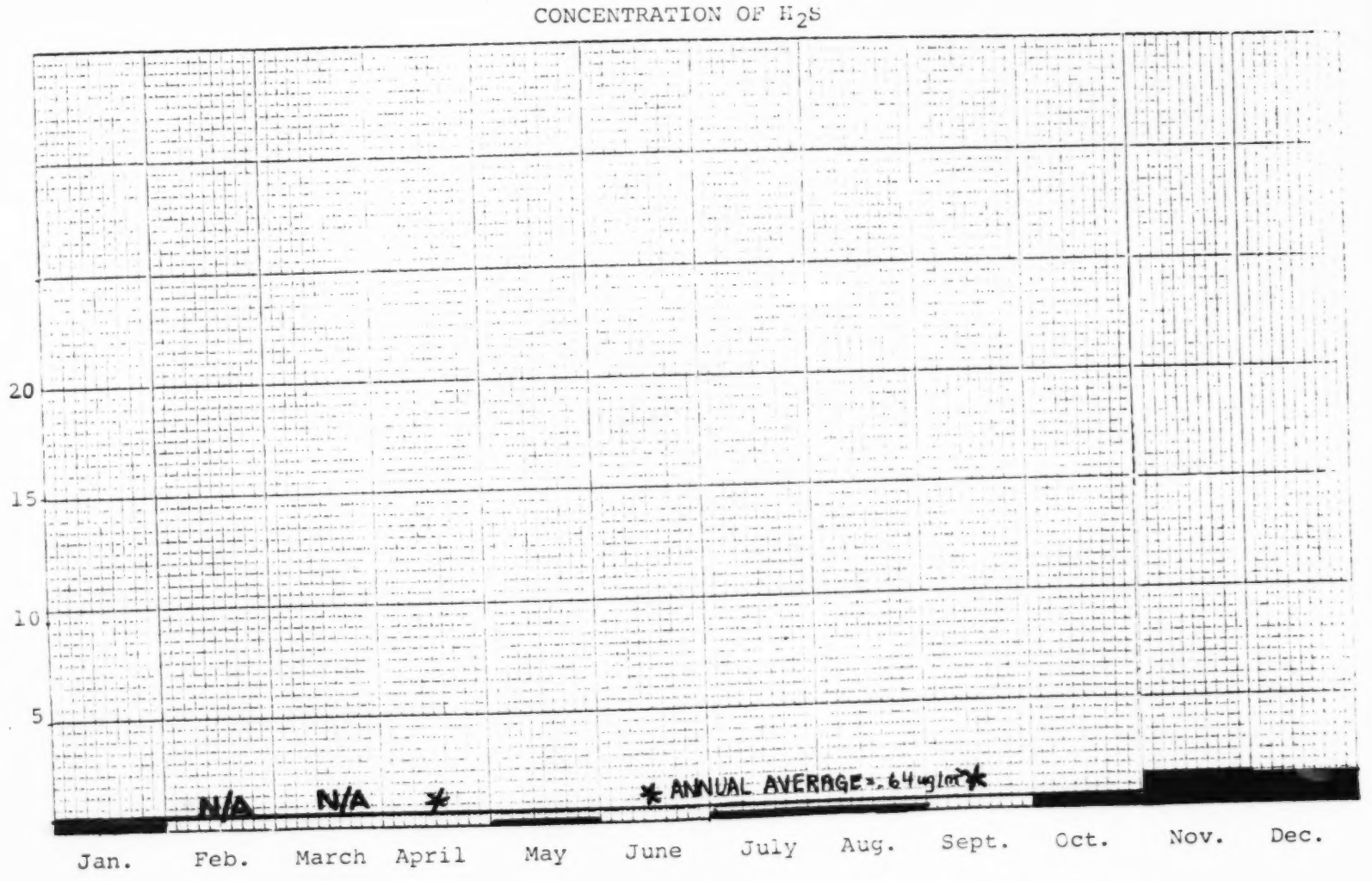
TABLE: 7G2

FREQUENCY OF EXCEEDANCE OF PROVINCIAL STANDARDS

MONITORING LOCATION: DeMonts Street

MONTH	SO_2 1 Hr. Stand.	SO_2 24 Hr. Stand.	CO 1 Hr. Stand.	H_2S 1 Hr. Stand.	NO_2 1 Hr. Stand.	T.S.P. 24 Hr. Stand.
JANUARY	N/A	N/A	NOT MEASURED	1	NOT MEASURED	NOT MEASURED
FEBRUARY	N/A	N/A		N/A		
MARCH	N/A	N/A		N/A		
APRIL	N/A	N/A		2*		
MAY	N/A	N/A		0*		
JUNE	N/A	N/A		1*		
JULY	N/A	N/A		0		
AUGUST	N/A	N/A		1		
SEPTEMBER	N/A	N/A		2*		
OCTOBER	N/A	N/A		0		
NOVEMBER	N/A	N/A		7		
DECEMBER	N/A	N/A		7		
TOTAL FOR YEAR	N/A	N/A		21		

FIGURE: 7G1 STATION: DEMONTS STREET



CHAMPLAIN HEIGHTS - MURIEL AVENUE

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Table 7H1 Averaged Data
Sulphur Dioxide

Table 7H2 Frequency of Exceedance of Provincial Standards
Sulphur Dioxide

Figure 7H1 Concentration of SO_2

TABLE: 7H1

MONITORING LOCATION: Champlain Heights - Muriel Avenue

YEAR: 1981

MONTH	Monthly Averages					
	SO_2 (ug/m^3)	CO (ug/m^3)	O_3 (ug/m^3)	NO_2 (ug/m^3)	H_2S (ug/m^3)	S.R. (mgSO_3/100cm^2/day)
JANUARY	55.39	NOT MEASURED	NOT MEASURED	NOT MEASURED	NOT MEASURED	NOT MEASURED
FEBRUARY	56.45					
MARCH	43.00					
APRIL	38.96					
MAY	37.90					
JUNE	71.29					
JULY	60.69					
AUGUST	67.05					
SEPTEMBER	121.37*					
OCTOBER	57.24					
NOVEMBER	36.04					
DECEMBER	9.54					
ANNUAL AVERAGE	48.52 (1.83 pphm)					

TABLE: 7H2

FREQUENCY OF EXCEEDANCE OF PROVINCIAL STANDARDS

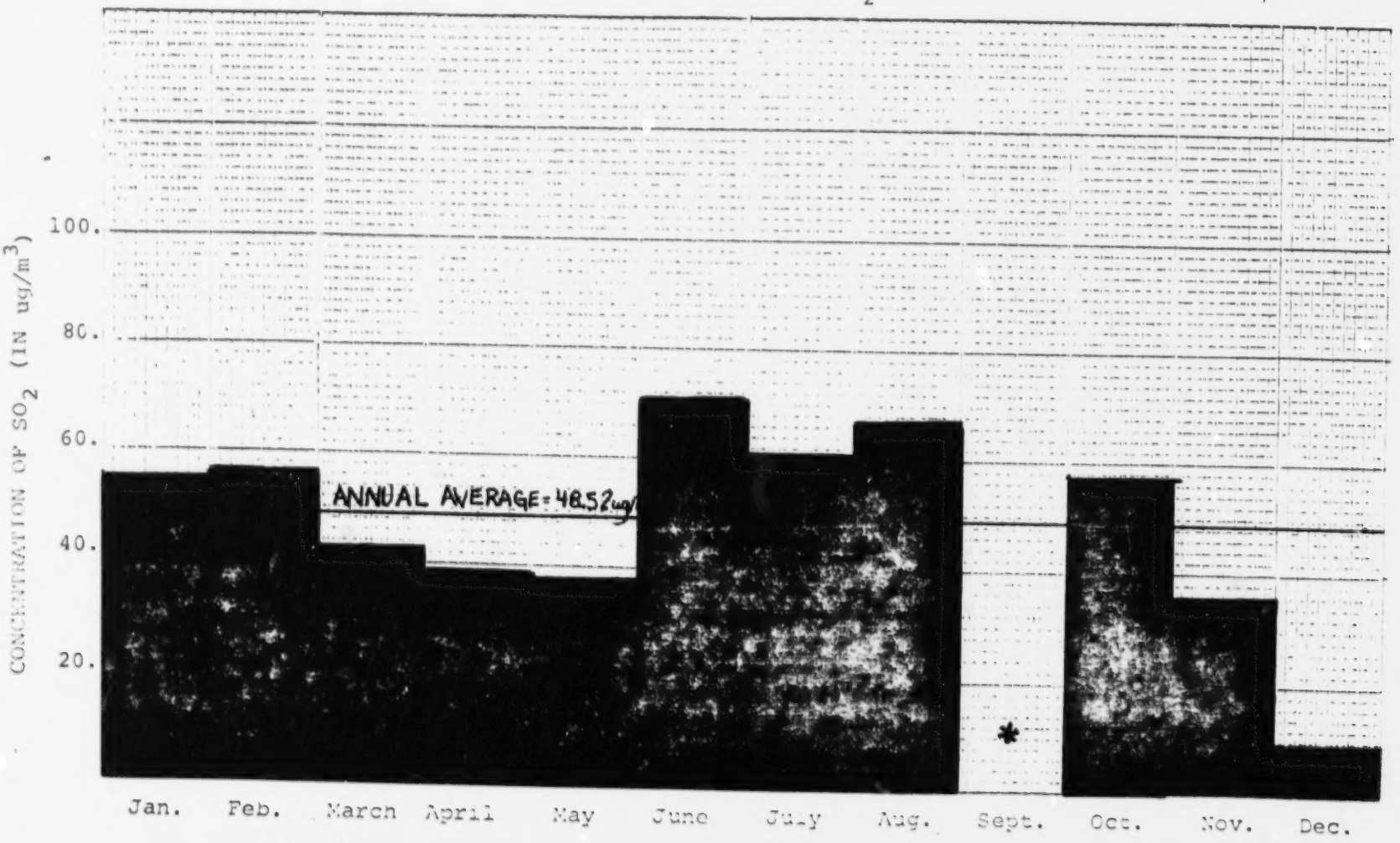
MONITORING LOCATION: Champlain Heights - Muriel Avenue

MONTH	SO_2 1 Hr. Stand.	SO_2 24 Hr. Stand.	CO 1 Hr. Stand.	H_2S 1 Hr. Stand.	NO_2 1 Hr. Stand.	T.S.P. 24 Hr. Stand.
JANUARY	0	0	NOT MEASURED	NOT MEASURED	NOT MEASURED	NOT MEASURED
FEBRUARY	0	1				
MARCH	0	0				
APRIL	0	0				
MAY	2	0				
JUNE	6	1				
JULY	4	0				
AUGUST	7	0				
SEPTEMBER	0*	0				
OCTOBER	4	1				
NOVEMBER	0	1				
DECEMBER	0	0				
TOTAL FOR YEAR	23	4				

FIGURE: 7H1

STATION: CHAMPLAIN HEIGHTS - MURIEL AVENUE

CONCENTRATION OF SO_2



8. Sulphation Rate Data

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Monitoring Locations

Provincial Hospital

Musquash Watershed Road

Ludgate Lake

Rockwood Park

Bloomsbury Mountain

Shadow Lake

Canaport

Note: Sulphation Rate was also measured at Millidgeville, Red Head, Forest Hills, Provincial Building and the DeMonts Street monitoring locations. Results are reported in Section 7.

SULPHATION RATES (S.R.)

MONTH	MONITORING LOCATIONS						
	PROVINCIAL HOSPITAL	WATERSHED ROAD	LUDGATE LAKE	ROCKWOOD PARK	BLOOMSBURY MOUNTAIN	SHADOW LAKE	CANAPORT
JANUARY	1.5	.11	.25	.43	N/A	N/A	.42
FEBRUARY	N/A	.1	.19	.75	.1	.13	.27
MARCH	.55	.19	.19	.36	.19	.23	.31
APRIL	1.9	.25	.24	.72	.28	.27	.36
MAY	.01	.56	.66	.08	.01	.01	.04
JUNE	.83	.10	.14	.77	.16	.10	.27
JULY	.57	.19	.19	.63	.27	.27	.27
AUGUST	.83	.12	.16	.68	.11	.17	.21
SEPTEMBER	1.0	.09	.15	.42	.09	.10	.17
OCTOBER	2.5	.21	.20	.49	.17	.26	.20
NOVEMBER	3.0	.40	.18	.37	.18	.18	.28
DECEMBER	3.6	.35	.36	.40	.35	.40	.44
ANNUAL AVERAGE	1.48	.22	.24	.51	.17	.19	.27

Units for S.R. $mgSO_3/100cm^2/day$

9. Dustfall Data

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Monitoring Locations

Brookville - Highway Substation
Brookville - Hill Substation
Brookville - Bishop's
Provincial Hospital

DUST BUCKET RESULTS

MONITORING LOCATIONS

MONTH	BROOKVILLE HWY.SUBSTATION	BROOKVILLE HILL SUBSTATION	BROOKVILLE BISHOP'S	PROVINCIAL HOSPITAL
JANUARY	6.0	8.8	11.6	18.2
FEBRUARY	18.2	17.5	16.8	28.7
MARCH	6.7	6.3	17.9	13.0
APRIL	18.2	50.8	32.6	43.8
MAY	6.3	4.9	21.0	9.1
JUNE	7.4	23.5	11.2	12.6
JULY	2.0	3.9	3.0	2.4
AUGUST	4.9	1.8	16.1	7.7
SEPTEMBER	1.1	6.0	14.0	7.7
OCTOBER	6.0	7.1	11.9	9.1
NOVEMBER	2.8	28.7	20.2	4.6
DECEMBER	5.3	7.4	7.0	12.6
ANNUAL AVERAGE	7.1	13.9	15.3	14.1

Units for Dust: gm $/m^2$/month

10. Summary of Results - 1981

Measurement of Coefficient of Haze was discontinued at the end of 1980. Carbon monoxide and ozone measurement were discontinued at the Western District Police Station due to equipment problems.

Sulphur dioxide was measured at seven monitoring stations. The annual average for sulphur dioxide was below the Provincial Standard for each station. Of the seven locations, the highest annual average for sulphur dioxide was measured at Champlain Heights, with the highest readings occurring during June, July, August and September.

The annual average for sulphur dioxide increased over the 1980 annual average for the Western District Police Station, Red Head and Champlain Heights Stations. The largest increases occurred at Champlain Heights and Red Head.

The number of exceedances in the Provincial Standards for sulphur dioxide decreased from 1980. The highest number of exceedances occurred at the Champlain Heights Station where the one hour standard was exceeded twenty-three times and the twenty-four hour standard four times.

Carbon monoxide was measured at two locations. The annual average at both locations decreased from 1980. There were no exceedances of the one hour Provincial Standard for CO at either of the monitoring locations.

Nitrogen dioxide was measured at the Post Office location. The 1981 annual average increased by more than five fold over 1980. There were six exceedances of the one hour Provincial Standard for nitrogen dioxide during 1981.

Ozone was monitored at two locations during 1981 with Forest Hills measuring the highest annual average for the year.

There was a dramatic decrease in the number of exceedances of the one hour Provincial Standard for H_2S at the De-Monts Street location in 1981 over 1980. There were twenty-one exceedances in 1981 compared to seven hundred and twelve in 1980. Confidence in this data is low for all of 1981 due to difficulties experienced in operating this rather aged monitor.

Annual averages for T.S.P. at all five monitoring locations showed decreases from the previous year. The annual

averages for T.S.P. at all monitoring locations were below the Provincial Standard with the Provincial Building having the highest annual average. The Millidgeville recorded the only exceedance of the twenty-four hour Provincial Standard.

There are three monitoring locations which measured SO_4 in conjunction with T.S.P. The highest annual averages were recorded at the Provincial Building and Red Head monitoring sites. The annual averages for SO_4 in 1981 decreased from those of 1980.

There are twelve locations at which Sulphation Rate was measured during 1981. The Forest Hills, Provincial Building, Provincial Hospital, Musquash Watershed Road, Ludgate Lake and Rockwood Park all showed an increase in the annual average for S. R. over 1980. The Millidgeville location showed a decrease inthe annual average .

Dustfall was measured at four stations during 1981. The Brookville-Bishop's location recorded the highest annual average for dustfall. The Brookville-Bishop's site and the Provincial Hospital site recorded decreases in dustfall compared to 1980.

These results indicate that the majority of the air

quality problems in the Saint John region are caused locally and are, in most cases, short term in nature.

The long term air quality objectives as set out by the Federal Guidelines and Provincial Regulations are in most cases being met.

11. Cumulative Record of Annual Concentrations.

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Table 11A CUMULATIVE RECORD OF ANNUAL CONCENTRATIONS SULPHUR DIOXIDE ug/m^3

YEAR	POLICE STATION	MILLIDGE-VILLE	POST OFFICE	RED HEAD	FOREST HILLS	CHAMPLAIN HEIGHTS	DEMONTS STREET	BROOK-VILLE
1974	3.31	-	57.40	16.39	-	-	-	-
1975	2.12	20.80	34.14	16.67		-	-	-
1976	3.78	20.16	38.79	15.68	27.52	-	-	13.02
1977	4.43	20.58	42.69	21.36	48.57	27.56	55.97	-
1978	9.22	13.39	18.99	17.73	40.09	35.70	35.35	-
1979	7.73	17.38	48.39	13.30	38.69	34.24	33.08	-
1980	19.26	16.94	34.03	8.02	54.02	42.00	25.35	-
1981	21.18	14.98	39.18	13.22	44.4	48.52	-	-

Table 11B

CUMULATIVE RECORD OF ANNUAL CONCENTRATIONS

	NITROGEN DIOXIDE		CARBON MONOXIDE		DUSTFALL gm/m^2			
YEAR	POST OFFICE	FOREST HILLS	POST OFFICE	FOREST HILLS	POLICE STATION	BROOKVILLE SUB.STN.	BROOKVILLE HILL	BISHOP'S	PROVINCIAL HOSPITAL
1974	-	-	-	-	-	-	-	-	5.7
1975	-	-	-	-	-	-	-	-	8.1
1976	-	-	-	-	-	10.3	11.8	24.6	9.2
1977	-	19.59	-	1510	-	4.5	8.2	11.2	9.1
1978	-	13.52	-	720	-	11.0	9.0	16.1	13.0
1979	-	16.91	-	650	-	5.2	8.9	13.9	8.2
1980	5.70	13.51	810.5	746	-	5.1	17.4	21.3	11.6
1981	31.04	-	397.2	464.7	-	7.1	13.9	15.3	14.1

CUMULATIVE RECORD OF ANNUAL CONCENTRATIONS

TOTAL SUSPENDED PARTICULATE/SULPHATE ug/m^3 OZONE ug/m^3 H_2S ug/m^3

YEAR	POLICE STATION		MILLIDGE-VILLE		PROV. BLDG.		RED HEAD		FOREST HILLS		POST OFFICE	POLICE STATION	FOREST HILLS	DEMONTS STREET
	TSP	SO_4	TSP	SO_4	TSP	SO_4	TSP	SO_4	TSP	SO_4				
1974	43.7	-	41.6	-	61.5	-	33.8	-	-	-	-	-	-	-
1975	36.7	-	52.6	-	51.7	-	31.2	-	-	-	-	-	-	-
1976	36.8	-	55.8	-	49.4	-	28.1	-	51.0	-	-	-	-	-
1977	32.6	-	44.3	-	63.0	-	27.9	-	43.6	-	-	-	76.26	-
1978	38.2	2.30	54.9	-	56.8	5.7	30.6	4.1	53.2	-	-	-	63.12	6.64
1979	36.9	1.30	50.1	-	58.3	4.10	28.6	2.10	38.1	-	-	-	-	4.83
1980	38.0	2.30	54.8	-	68.8	6.2	35.8	2.90	43.3	-	47.4	46.5	52.5	9.07
1981	30.5	1.66	38.5	-	57.2	3.89	32.7	2.52	38.5	-	35.22	-	45.22	0.64

Table 11D1 CUMULATIVE RECORD OF ANNUAL CONCENTRATIONS

SULPHATION RATE $mgSO_3/100cm^2/day$

YEAR	PROV. BLDG.	MUSQU. ROAD	PROV. BLDG.	RED HEAD	LUDGATE LAKE	ROCKWOOD PARK	BLOOMSB. MOUNTAIN	SHADOW LAKE	CANA-PORT	FOREST HILLS	DEMONTS STREET	MILLIDG VILLE
1974	1.89	-	-	0.62	-	-	-	-	-	-	-	-
1975	2.46	-	-	1.22	-	-	-	-	-	-	-	-
1976	1.62	0.31	1.09	0.42	0.25	0.51	0.31	0.15	-	-	-	.62
1977	1.45	0.26	1.43	0.45	0.26	0.50	0.25	0.30	-	0.75	0.54	.42
1978	1.83	0.41	1.04	0.46	0.52	0.55	0.46	0.16	-	1.21	0.81	.78
1979	3.91	0.37	1.39	0.75	0.45	,59	0.43	0.50	0.49	0.74	1.02	.53
1980	1.44	0.13	0.79	0.36	0.20	0.47	0.17	0.20	0.27	0.55	.49	.43
1981	1.48	0.22	0.90	0.36	0.24	0.51	0.17	0.19	0.27	0.66	0.48	.32

Table 11D2 CUMULATIVE RECORD OF ANNUAL CONCENTRATIONS

SULPHATION RATE $mgSO_3/100cm^2/day$

YEAR	DUCK COVE	COURTENAY BAY	HIGHLAND ROAD	BROOKVILLE HWY. SUB.	LORNEVILLE MCCAVOUR	WESTERN DIST. POLICE STA.
1974	0.46	0.47	0.36	0.36	.12	-
1975	0.48	0.78	0.40	0.42	.23	-
1976	0.32	-	-	-	-	.29
1977	-	-	-	-	-	-
1978	-	-	-	-	-	-